



GRIDS

GRID-SCALE RENEWABLE ENERGY STORAGE

PROJECTS:	12	FUNDING YEAR:	2010
TOTAL INVESTMENT:	\$27.7 million	PROGRAM DIRECTOR:	Dr. Mark Johnson
PROJECT DETAILS:	www.arpa-e.energy.gov/ProgramsProjects/GRIDS.aspx		

PROGRAM

The 12 projects that comprise ARPA-E's GRIDS program, short for "Grid-Scale Rampable Intermittent Dispatchable Storage," are developing storage technologies that can store renewable energy for use at any location on the grid at an investment cost less than \$100 per kilowatt hour. Flexible, large-scale storage would create a stronger and more robust electric grid by enabling renewables to contribute to reliable power generation.

INNOVATION NEED

Our national electric grid is not always well-equipped to handle energy from renewable sources. Today's network, which delivers electricity from suppliers to consumers, is dependent on fossil fuels, with over 70% of electricity generation coming from coal or natural gas. The grid has limited ability to store excess energy, so electricity must constantly be generated to perfectly match demand. Though wind and solar power are promising clean alternatives to fossil fuels, their natural unpredictability and intermittency present major challenges to delivery of the consistent power that is necessary to operate today's grid.

GRIDS PROGRAM GOALS

- Connect renewable sources to the grid
- Efficiently store and send electricity anywhere in the U.S.
- Strong, efficient and robust electric grid

The energy storage facilities that exist today use pumped hydropower, which is only available in a handful of locations. New, more flexible, large-scale energy storage technologies would allow energy to be efficiently stored and sent to any location in the country. This ability to reliably store and utilize energy will enable the widespread use of renewable alternatives to fossil fuels. Cost-effective grid-scale energy storage is critical for increasing the use of renewable alternatives and reducing greenhouse gas emissions from the electric energy sector.

POTENTIAL IMPACT

If successful, the development of advanced energy storage technologies would store vast amounts of electric energy at low cost, which would enable widespread use of wind and solar energy to power the grid. Investing in these technologies will position the U.S. as the leader in the emerging global market for energy storage infrastructure.

- **SECURITY:** A more efficient and reliable grid would be more resilient to potential disruptions.
- **ENVIRONMENT:** Electricity generation accounts for over 40% of U.S. carbon dioxide (CO₂) emissions. Enabling large-scale contributions of wind and solar power for our electricity generation would result in a substantial decrease in CO₂ emissions.
- **ECONOMY:** Increases in the availability of wind and solar power would reduce fossil fuel demand, resulting in reduced fuel prices and more stable electricity rates.
- **JOB:** Advances in energy storage would result in new high-paying jobs in supporting sectors such as manufacturing, engineering, construction, transportation, and finance.